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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/226,216	01/07/1999	HISASHI OHTANI	0756-1921	1375

22204 7590 01/02/2002

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EXAMINER

SCHILLINGER, LAURA M

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 01/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/226,216

Applicant(s)

OHTANI ET AL.

Examiner

Laura M Schillinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 9/28/01.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-9, 16-18, 20-22, 24-38 and 40-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-9, 16-18, 20-22, 24-38, 40-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 5-9 and 16-18, 20-22, 24-38, and 40-44 are rejected under 35 U.S.C. 102(e) as being anticipated by Mitnaga et al ('997).

In reference to claim 5, Mitnaga teaches a method comprising:

forming a semiconductor film comprising amorphous Si (Abs., lines: 1-10);
crystallizing the film by a heat treatment while a promoting material for facilitating crystallization is retained on or under the semiconductor film (Abs., lines: 1-10);
removing the promoting material for crystallization from a surface of the semiconductor film after the heat treatment (Col. 17, lines: 30-60);
promoting crystallinity of the crystallized semiconductor film by irradiation of laser or intense light (Col. 1, lines: 55-65);

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wherein the promoting material comprises one or more elements selected from the groups consisting of group 14 elements (Col.3, lines: 40-50).

Response to Arguments

Applicant's arguments filed 9/28/01 have been fully considered but they are not persuasive. Applicant argues that gettering is not removing- applicant is wrong- gettering is removing. If applicant wishes to exclude gettering processes from the available methods of removing catalysts applicant MUST amend the claim language to specify removal methods which do not include gettering.

In reference to claim 6, Mitnaga teaches wherein the promoting material is Ge (Col.3, lines:45-47).

In reference to claim 7, Mitnaga teaches a method comprising:

applying a solution in which a simple substance of a catalytic element for facilitating crystallization of amorphous Si film or a compound containing the catalytic element is dissolved or dispersed, on a semiconductor film comprising amorphous Si (Col.3, lines: 40-50 and Col.11, lines: 44-50);

baking the film to form a film with a catalytic element on the film (Col.11,lines: 50-60)

crystallizing the amorphous Si film by carrying out a heat treatment (Col.12,lines: 43-60);

and

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promoting crystallinity by irradiation of laser light or intense light, wherein a plural kind of elements selected from elements in group 14 are used as the catalytic element (Col.13, lines: 25-40).

In reference to claim 8, Mitnaga teaches wherein Ge is used as the catalyst (Col.3, lines:40-50).

In reference to claim 9, Mitnaga teaches wherein the compound containing the catalytic element is at least one selected from the group consisting of GeBr (2), GeCl(2), GeI(2), GeO(2), GeS(2), germane, germane acetate, tris (2,4-pentanedionate) germanium perchlorate, tetramethylgermane, tetrethylgermane, tetraphenylgermane, and hexaethyl germanium (Col.3, lines: 40-50).

In reference to claim 16, Mitnaga teaches a method comprising:

forming a semiconductor film comprising amorphous Si on an insulating surface (Abs., lines: 1-10);

forming a film comprising Ge in contact with the semiconductor film by VPD with a Ge gas (Col.4, lines: 25-30);

heating the film with the Ge to crystallize the film (Abs., lines: 1-10);

removing the film with Ge from a semiconductor film without changing the shape of the film after heating the film (Col.17,lines: 30-60).

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In reference to claim 17, Mitnaga teaches wherein the film comprising Ge is formed by LPCVD (Col.4, lines:25-30).

In reference to claim 18, Mitnaga teaches wherein the Ge containing gas is GeH₄ (Col.6, lines: 25-35).

In reference to claim 19, Mitnaga teaches further comprising removing the Ge containing film after crystallization (Col.17, lines: 45-60).

In reference to claim 20, Mitnaga teaches a method comprising:

- forming a semiconductor film comprising amorphous Si on an insulating surface (Abs., lines: 1-10);

- forming a film comprising Ge in contact with the semiconductor film by VPD with a Ge compound gas (Col.4, lines: 25-30 and Col.6, lines: 25-35);

- heating the semiconductor film with the film comprising Ge to crystallize the semiconductor film (Abs., lines: 1-10);

- removing the film with Ge from a semiconductor film without changing the shape of the film after heating the film (Col.17, lines: 30-60);

- patterning the crystallized semiconductor film into at least one semiconductor island (Col.11, lines: 1-5);

- forming a thin film transistor with the semiconductor island used as at least a channel forming region thereof (Col.11, lines: 1-10).

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In reference to claim 21, Mitnaga teaches wherein the film comprising Ge is formed by LPCVD (Col.4, lines: 25-30).

In reference to claim 22, Mitnaga teaches wherein the Ge containing gas is GeH_4 (Col.6, lines:25-35).

In reference to claim 23, Mitnaga teaches further comprising removing the film comprising Ge after the crystallization of the semiconductor film (Col.17, lines:45-60).

In reference to claim 24, Mitnaga teaches wherein the device is a video camera (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 25, Mitnaga teaches wherein the device is a mobile computer (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 26, Mitnaga teaches wherein the device is a portable telephone (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

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In reference to claim 27, Mitnaga teaches wherein the device is a head mount display (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 28, Mitnaga teaches wherein the device is a projector (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 29, Mitnaga teaches wherein the device is a video camera (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 30, Mitnaga teaches wherein the device is a mobile computer (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 31, Mitnaga teaches wherein the device is a portable telephone (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

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In reference to claim 32, Mitnaga teaches wherein the device is a head mount display (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 33, Mitnaga teaches wherein the device is a projector (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 34, Mitnaga teaches wherein the device is a video camera (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 35, Mitnaga teaches wherein the device is a mobile computer (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 36, Mitnaga teaches wherein the device is a portable telephone (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

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In reference to claim 37, Mitnaga teaches wherein the device is a head mount display (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 38, Mitnaga teaches wherein the device is a projector (See independent claim rejection above- this claim is a linking claim and is rejected as long as the independent method claim is also rejected).

In reference to claim 40, Mitnaga teaches a method comprising:

forming a semiconductor film comprising amorphous Si on an insulating surface (Abs., lines: 1-10);

forming a film comprising Ge in contact with the semiconductor film by VPD with a Ge compound gas (Col.4, lines: 25-30 and Col.6, lines: 25-35);

heating the semiconductor film with the film comprising Ge to crystallize the semiconductor film (Abs., lines: 1-10);

removing the film with Ge from a semiconductor film without changing the shape of the film after heating the film (Col.17, lines: 30-60);

irradiating with laser after removing Ge (Col.15, lines: 50-55).

In reference to claim 41, Mitnaga teaches a method comprising:

forming a semiconductor film comprising amorphous Si (Abs., lines: 1-10);

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crystallizing the film by a heat treatment while a promoting material for facilitating crystallization is retained on or under the semiconductor film (Abs., lines:1-10);

removing the promoting material for crystallization from a surface of the semiconductor film after the heat treatment (Col.17, lines: 30-60);

wherein the promoting material is of Group 14 (Col.18, lines: 55-61).

In reference to claim 42, Mitnaga teaches a method comprising:

applying a solution in which a simple substance of a catalytic element for facilitating crystallization of amorphous Si film or a compound containing the catalytic element is dissolved or dispersed, on a semiconductor film comprising amorphous Si (Col.3, lines: 40-50 and Col.11, lines: 44-50);

baking the film to form a film with a catalytic element on the film (Col.11,lines: 50-60)

crystallizing the amorphous Si film by carrying out a heat treatment (Col.12,lines: 43-60);

removing the film with promoting material from a semiconductor film without changing the shape of the film after heating the film (Col.17,lines: 30-60)

wherein a plural kind of elements selected from elements in group 14 are used as the catalytic element (Col.13, lines: 25-40).

In reference to claim 43, Mitnaga teaches a method comprising:

forming a semiconductor film comprising amorphous Si (Abs., lines: 1-10);

providing a promoting material for facilitating crystallization is retained on or under the semiconductor film (Abs., lines:1-10);

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crystallizing the amorphous Si film by carrying out a heat treatment (Col.12,lines: 43-60);
removing the promoting material for crystallization form a surface of the semiconductor film after the heat treatment (Col.17, lines: 30-60);
promoting crystallinity by irradiation of laser light or intense light (Col.13, lines: 25-40);
patterning the semiconductor film into an island (Col.15, lines: 10-15);
wherein a plural kind of elements selected from elements in group 14 are used as the catalytic element (Col.13, lines: 25-40).

In reference to claim 44, wherein removing the film with promoting material from a semiconductor film without changing the shape of the film after heating the film (Col.17,lines: 30-60).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Noguchi ('084) teaches a very similar method for a TFT.

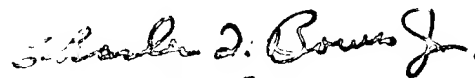
Any inquiry concerning this communication from examiner should be directed to Laura Schillinger whose telephone number is (703) 308-6425. The examiner can normally be reached by telephone on Monday to Friday from 6:30 AM to 4:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Bowers, can be reached on (703) 308-2417. The fax phone number for the group is (703) 308-7722.

LMS

December 27, 2001



Charles Bowers
Supervisory Patent Examiner
Technology Center 2800